LOUISIANA DEPARTMENT OF WILDLIFE & FISHERIES

OFFICE OF FISHERIES
INLAND FISHERIES SECTION

PART VI - B

WATERBODY MANAGEMENT PLAN SERIES

AMITE RIVER, LOUISIANA

WATERBODY EVALUATION &
RECOMMENDATIONS

CHRONOLOGY

DOCUMENT SCHEDULED TO BE UPDATED ANNUALLY

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WATERBODY EVALUATION

STRATEGY STATEMENT

Recreational
Recreational fish species are managed to maintain sustainable populations while providing anglers the opportunity to catch or harvest numbers of fish.

Commercial
Commercial fish species are managed to provide sustainable populations.

Species of Special Concern
Species of special concern are managed toward viable, self-sustaining populations.

EXISTING HARVEST REGULATIONS

Recreational
All statewide regulations apply to game fish species, see link below:
http://www.wlf.louisiana.gov/fishing/regulations

Commercial
All statewide regulations apply to commercial fish species, see link below:
http://www.wlf.louisiana.gov/fishing/regulations

Species of Special Concern
Paddlefish (*Polyodon spathula*) 30" max lower jaw fork length, 2 fish daily limit, fish cannot be retained alive; fish cannot be harvested by snagging methods. Pallid sturgeon (*Scaphirhynchus albus*), shovelnose sturgeon (*Scaphirhynchus platorynchus*), and Gulf sturgeon (*Acipenser oxyrinchus desotoi*) no legal harvest or possession
http://www.wlf.louisiana.gov/fishing/regulations

SPECIES EVALUATION

Recreational
Largemouth bass (*Micropterus salmoides, M. floridanus, and M. salmoides x floridanus hybrids*) are targeted for evaluation since they are a species indicative of the overall fish population due to their high position in the food chain and because they are highly sought after by anglers. Electrofishing is the best indicator of largemouth bass abundance and size distribution, with the exception of large fish.

Largemouth Bass

Catch per unit effort, relative weight and structural indices

Spring electrofishing results indicate considerable variability of catch-per-unit-effort (CPUE) of largemouth bass following Hurricanes Katrina, Gustav and Isaac in 2005, 2008 and 2012, respectively (Figure 1). The storms created unfavorable water quality conditions, such as low dissolved oxygen, that resulted in major fish kills. The second year following Hurricane Gustav, 2010, the mean total CPUE for largemouth bass rebounded to nearly 120 fish per hour. A similar rebound was observed in the second year following Hurricane Isaac, 2014, with a mean total CPUE of nearly 100 fish per hour. Sub-stock and stock-size fish rebounded in the fall of 2009 and 2010, while only sub-stock-sized fish were observed in 2013 (Figure 2).

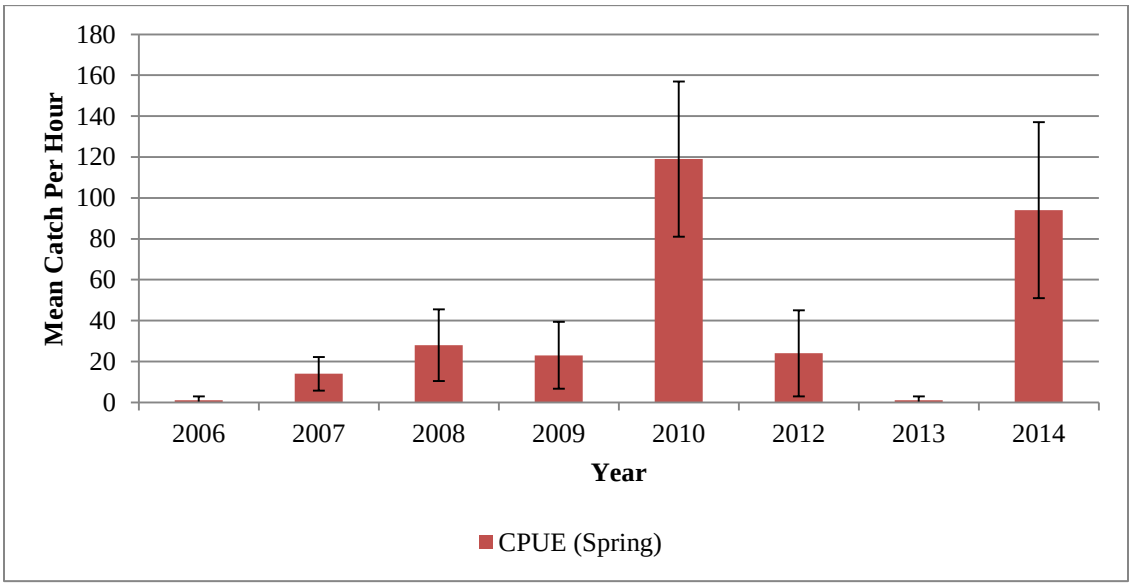

Figure 1. The mean CPUE (± 95% CI) number per hour for largemouth bass from Amite River, LA, in spring electrofishing results from 2006 to 2014. CI = confidence limits of the mean CPUE. Values for n by year: n=1 (2006), n=14 (2007), n=28 (2008), n=23 (2009), n=119 (2010), n=24 (2012), n=1 (2013), n=94 (2014).

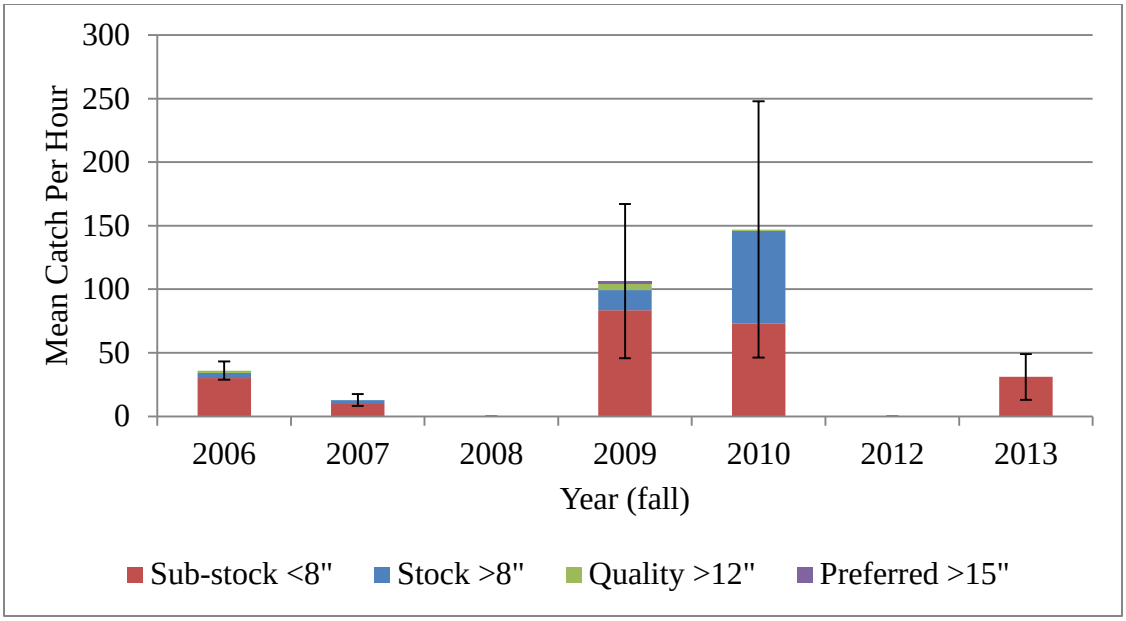

Figure 2. The mean CPUE (±95% CI) for sub-stock- (<8"), stock- (>8"), quality- (>12") and preferred-size (>15") largemouth bass from the Amite River, LA for fall electrofishing results from 2006 to 2013. CI = confidence limits of the total mean CPUE. Values for n by year: n=30 (2006), n=15 (2007), n=0 (2008), n=92 (2009), n=150 (2010), n=0 (2012), n=31 (2013).

Proportional stock density (PSD) and relative stock density (RSD) are indices used to numerically describe length-frequency data. Proportional stock density compares the number of fish of quality-size (greater than 12 inches for largemouth bass) to the number of bass of stock-size (8 inches in length). The PSD is expressed as a percent. A fish population with a high PSD consists mainly of larger individuals, whereas a population with a low PSD consists mainly of smaller fish. For example, Figure 3 below indicates a PSD of 50 for 2009. The number indicates that 50% of the bass stock (fish over 8 inches) in the sample was at least 12 inches or longer.

$$PSD = \frac{\text{Number of bass>12 inches}}{\text{Number of bass>8 inches}} \text{ x100}$$

Relative stock density (RSD) is the proportion of largemouth bass in a stock (fish over 8 inches) that are 15 inches (preferred-size) or longer.

$$RSD = \frac{\text{Number of bass>15 inches}}{\text{Number of bass>8 inches}} \text{ x100}$$

Although there was an increase in the overall mean CPUE in 2010, the size-structure indices for largemouth bass decreased in both the proportion of quality-size and preferred-size fish

(Figure 3). Overall mean CPUE also increased in spring 2014, but no preferred-size fish were observed. The size distribution comparison (length frequencies) from 2009, 2010, 2012, 2013 and 2014 for spring electrofishing results show that in 2010, 2012, and 2014 there were more stock-size fish present than in 2009 and 2013 (Figure 4).

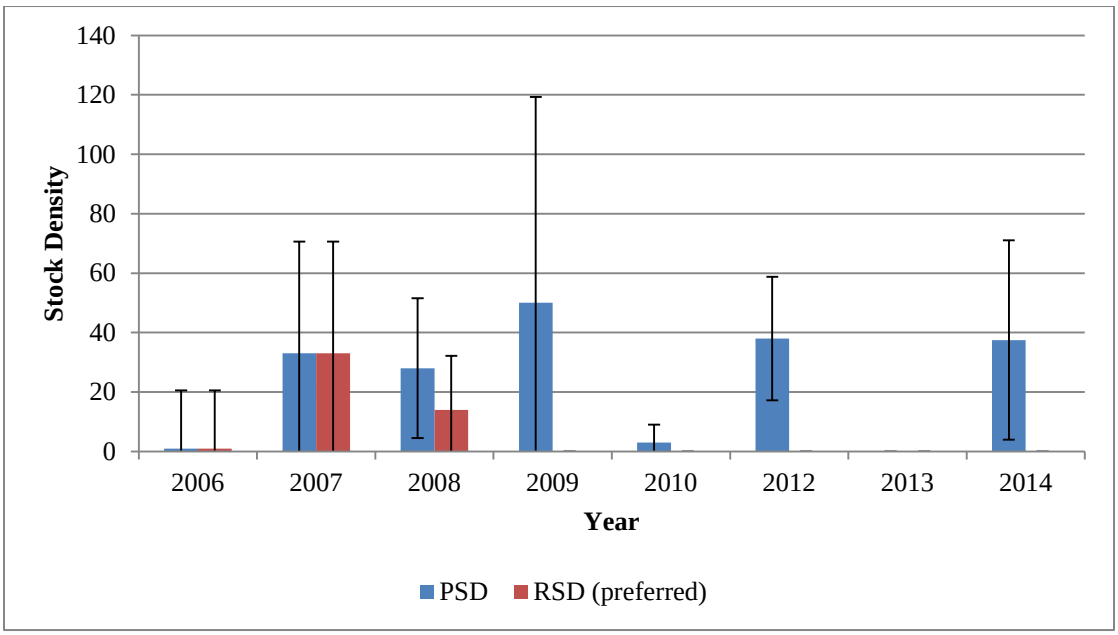

Figure 3. The mean size-structure indices (PSD and RSDp) for largemouth bass from Amite River, LA, for spring electrofishing results from 2006 to 2014. Error bars represent 95% confidence limits of the mean size-structure indices.

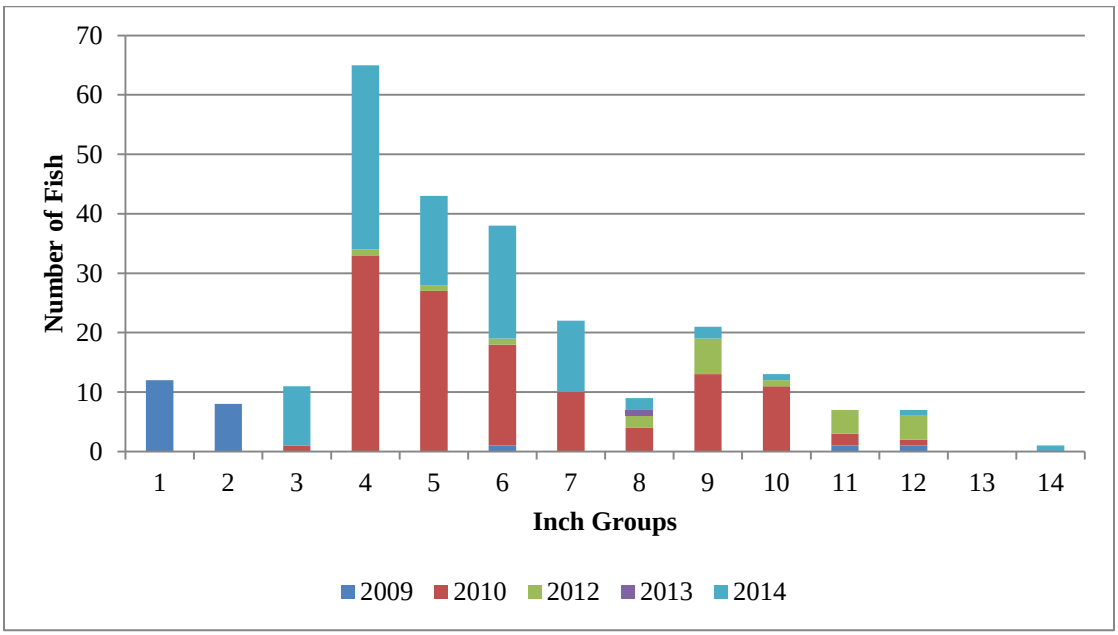

Figure 4. The size distribution (length frequencies) for largemouth bass on Amite River, LA, from spring electrofishing results for 2009 to 2012. Values for n by year: n=23 (2009), n=119 (2010), n=20 (2012), n=1 (2013), n=94 (2014).

Stocking and Genetics

Over 780,000 Florida bass (*M. floridanus*) have been stocked into the Amite River since 1996 (Table 1). A majority of these fish were stocked post Hurricanes Katrina and Gustav in response to public concern regarding extensive fish kills that occurred following these storms. In the post storm absence of predation and competition, the Florida largemouth bass should have become dominant in this coastal river, when in fact this species did not become established. Genetic testing conducted in 2010 indicated that less than 10% of the Florida genome was present in the sample results (Table 2). Additionally, higher CPUE's in 2010 (Figures 1 and 2), along with the genetic results, indicate that the remaining native largemouth bass population, although greatly reduced from pre-storm levels, recovered robustly and that any stocking efforts were unnecessary. The stocking of Florida largemouth bass in the adjacent Blind and Tickfaw Rivers showed a similar fate; the ineffectiveness to establish this genotype during post hurricane recovery. This tenacity for recovery of native largemouth bass populations has also been noted in other coastal river systems including the Calcasieu, Mermentau and Sabine rivers in southwest Louisiana following hurricanes Rita (2005) and Ike (2008). These systems received little to no stockings of largemouth bass before and after the hurricane related fish kills, yet yielded record CPUE's two years into recovery. These observations suggest that native coastal populations of largemouth bass (and other indigenous fish species) have adapted to these periodic storm events and rapid recovery is part of the natural selection process.

Table 1. Florida largemouth bass stockings into Amite River, LA from 1996 – 2010.

FLORIDA LMB STOCKING	
Year	Number of Fish
1996	17,371
1997	23,750
1999	16,772
2000	13,965
2001	10,000
2002	10,546
2003	10,036
2004	10,013
2005	10,059
2006	171,299
2007	175,695
2008	120,703
2009	186,419
2010	3,680
TOTAL	780,308

Table 2. Results of 2010 genetic testing for the Florida genome in largemouth bass from Amite River, LA.

Number of fish	% Northern	% Hybrid	% Florida
151	91	7	2

Recreational / Other Species

Crappie and Sunfish

Black and white crappies (*Pomoxis nigromaculatus and P. annularis*) have both been observed but not monitored in the river, as well as bluegill, redear, spotted, warmouth and longear sunfishes (*Lepomis macrochirus, L. microlophus, L. miniatus* and *L. gulosus, L. megalotis*, respectively).

Forage

Forage availability is typically measured directly through electrofishing and shoreline seine sampling and indirectly through measurement of largemouth bass body condition or relative weight. Relative weight (Wr) is the ratio of a fish's weight to the weight of a ''standard'' fish of the same length. The index is calculated by dividing the weight of a fish by the standard weight for its length, and multiplying the quotient by 100. Largemouth bass Wr below 80 indicate a potential problem with forage availability. Relative weights of largemouth bass caught in the Amite River ranged from 83 to 104 from 2006 to 2010 for all stock length-size and larger fish, indicating an adequate forage base (Figure 5). The mean Wr of largemouth bass from 2006, 2007, 2009 and 2010 is approximately 97 (Figure 6). This high Wr suggests that there is ample forage available for bass production.

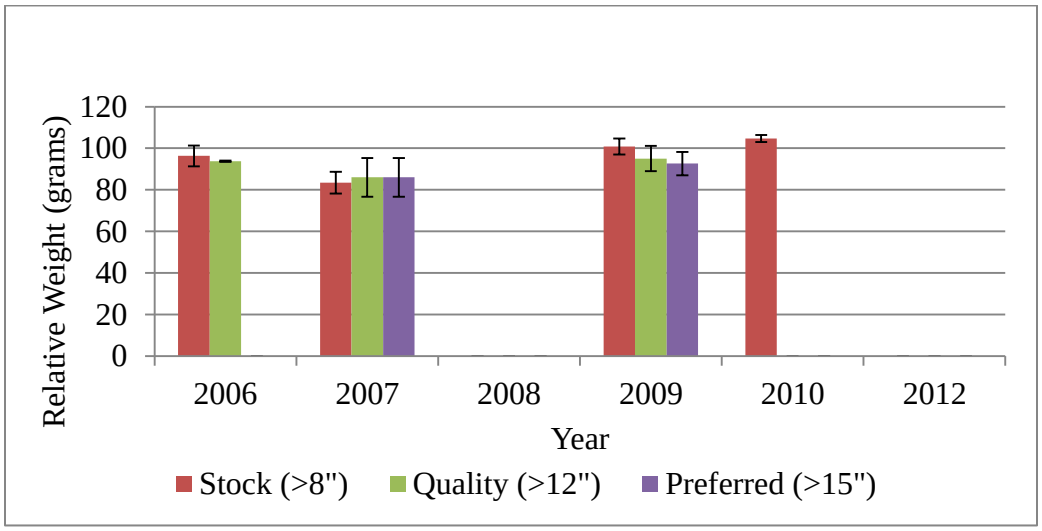

Figure 5. The mean relative weights (± 95% CI) for stock-, quality-, and preferred-size largemouth bass collected from Amite River, LA, in fall electrofishing samples from 2006 to 2012. Error bars represent 95% confidence limits of the mean relative weights. Values for n by year: n=6 (2006), n=8 (2007), n=0 (2008), n=26 (2009), n=77 (2010), n=0 (2012).

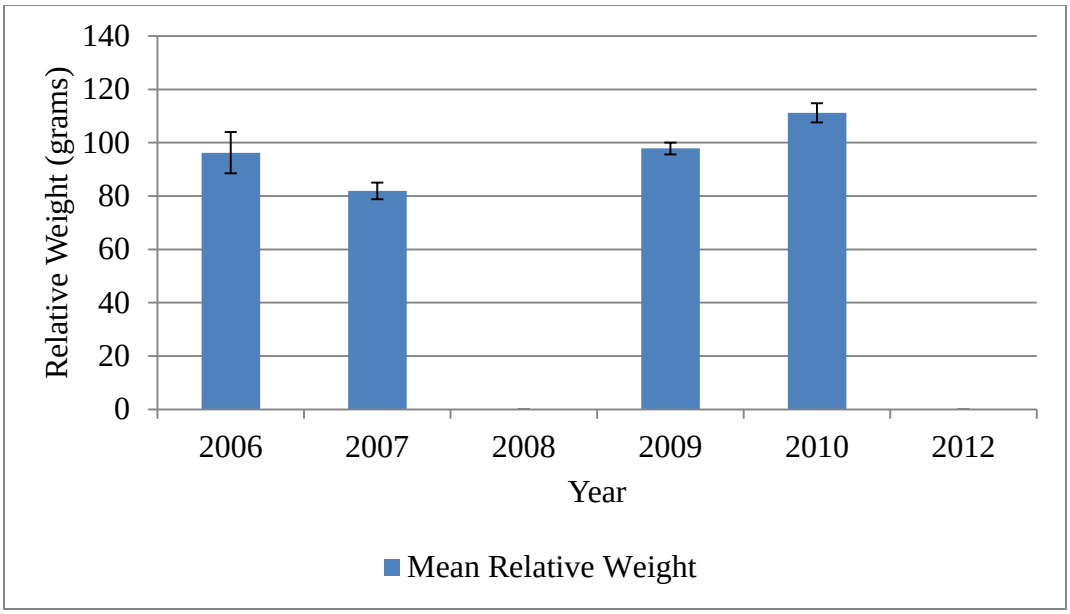

Figure 6. The mean relative weights (± 95% CI) for all largemouth bass collected from Amite River, LA, in fall electrofishing samples from 2006 to 2012. Error bars represent 95% confidence limits of the mean relative weights. Values for n by year: n=30 (2006), n=15 (2007), n=0 (2008), n=92 (2009), n=149 (2010), n=0 (2012).

Electrofishing samples from fall 2010 showed that the available forage was bluegill, longear and warmouth sunfishes, along with golden shiners (*Notemigonus crysoleucas*), gizzard and threadfin shad (*Dorosoma cepedianum* and *D. petenense* respectively; Figure 7).

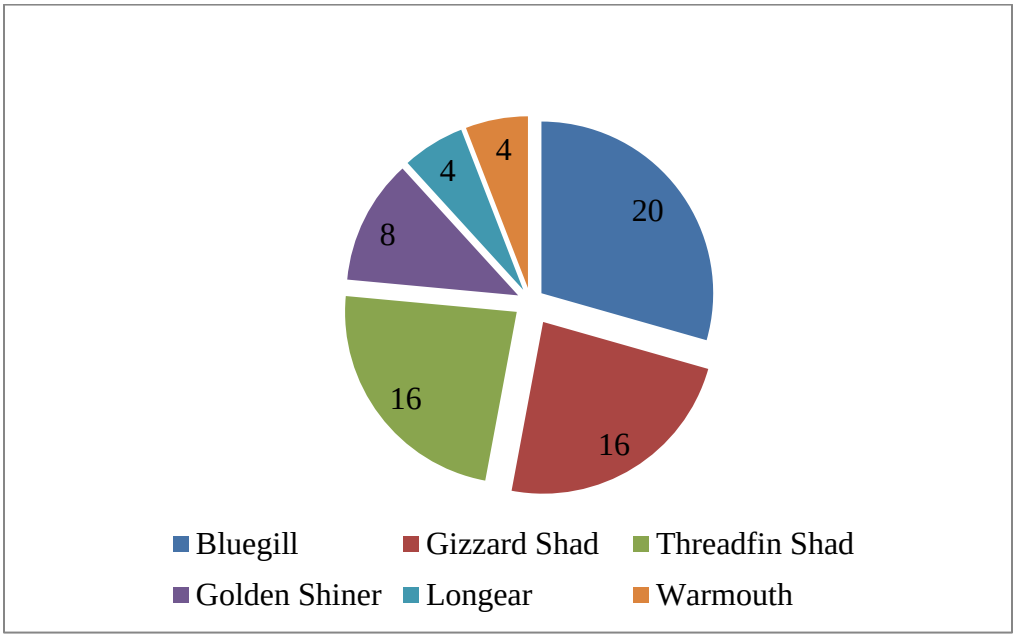

Figure 7. Forage composition CPUE by species on Amite River, LA, from fall electrofishing results 2012.

Aquatic Invasive Species

Though their population has not been monitored, common carp (*Cyprinus carpio*) are commonly observed in the river.

In early summer of 2012, two adult silver carp (*Hypophthalmichthys molitrix*) were observed in the river. An adult silver carp was also observed in late summer of 2013. These fish may have been introduced via the Bonne Carre Spillway operation by the US Army Corps of Engineers during the 2011 Mississippi River flood event. To date, no juveniles have been observed.

In winter 2012, following Hurricane Isaac, a commercial fisherman caught a plecostomus (*Hypostomus plecostomus*) measuring over ten inches in a hoop net.

HABITAT EVALUATION

Aquatic Vegetation

Nuisance species

Common salvinia and water hyacinth have been the main cause of complaints over the past few years. Common salvinia is scattered throughout the basin and is constantly being restocked by adjacent swamps and bayous. Within the river system, the desire to own/sell waterfront property has led to the construction of numerous man-made canals over the past 4 decades. These canals are typically 50 to 200 feet wide, dead-end offshoots of the main river channel. The canals are lined with houses, camps, boat slips, docks, and an occasional boat ramp. The canal systems are rarely designed so that river water can flow through unimpeded (i.e. horseshoe in shape, etc.). Consequently, these dead-end canals have no inherent "flushing" mechanism to discharge of floating vegetation. Invariably, some form of aquatic vegetation makes its way into these canals each year, remains there due to the stagnant water conditions, and thrives. When the suspect vegetation in these canals has reached critical mass, the home/camp owners complain.

Coverage

Estimates of vegetation coverage (as of September 30, 2013) are provided below:

Problematic Species -
Common Salvinia (*Salvinia minima)* – 100 acres
Water Hyacinth (*Eichhornia crassipes)* – 75 acres
Duckweed (*Lemna spp.)* – 15 acres
Duck Lettuce (*Ottelia alismoides*) – 50 acres
Crested Floating Heart (*Nymphoides cristata*) – 6 acres

Beneficial Species -
Yellow Water Lily (*Nymphaea mexicana)* – 100 acres
Coontail (*Ceratophyllum demersum)* – 100 acres

Biological Control
NONE

Chemical Control
A total 180 acres of nuisance vegetation was treated in 2013 by department personnel (Table 3).

Table 3. Herbicide treatments in Amite River, Louisiana 2013.

AMITE RIVER ACRES OF AQUATIC VEGETATION TREATED IN 2013			
SPECIES	**ACRES**	**HERBICIDES***	**APPLICATION RATES**
Water hyacinth	12	2,4-D	0.5 gal/acre
	3	Glyphosate	0.75 gal/acre
Alligator weed	28	2, 4-D	0.5 gal/acre
	12	Glyphosate	0.75 gal/acre
Water lettuce	1	Glyphosate	0.75 gal/acre
	2	Flumioxazin	8 oz/acre
Pennywort	1	2, 4-D	0.5 gal/acre
Primrose	1	2, 4-D	0.5 gal/acre
Duckweed	10	Diquat	0.75 gal/acre
	11	Glyphosate	0.75 gal/acre
Common Salvinia	4	Diquat/Flumioxazin	0.5 gal/ 4oz /acre
	41	Glyphosate	0.75 gal/acre
	54	Diquat	0.75 gal/acre
TOTAL	180		

Limitations
During high water periods within this river complex, common salvinia floods into the surrounding swamps where it flourishes. LDWF spray crews are unable to access these areas due to dense timber and shallow water. Consequently, common salvinia is transported from the swamp into the river when water levels drop.

Water Quality
In 2010, the EPA listed Amite River as an impaired river due to mercury, chloride and other dissolved solids. http://ofmpub.epa.gov/AMITE RIVER

Substrate
Sandy river bottoms, high in inorganic material.

CONDITION IMBALANCE / PROBLEM

1. Agricultural and urban development in the watershed has resulted in water quality impairment via contaminated runoff.

2. Channel modification and the creation of spoil banks have disconnected much of the surrounding swamp from the river system. As a result, there has been alteration in the natural hydrology, wetland degradation and loss, tree mortality, saltwater intrusion, swamp impoundment, reduced swamp access to aquatic life, and swamp subsidence.

3. Sand and gravel mining in the river has led to vegetation loss, bank instability and increased turbidity and sedimentation. Extensively mined reaches of the river have geomorphically changed from a meandering to a braided stream that is wide and shallow and void of riffle/pool complexes.

4. Amite River is very susceptible to major fish kills, especially in the event of a tropical storm or hurricane.

5. Nuisance aquatic vegetation impedes navigation and degrades habitat.

CORRECTIVE ACTION NEEDED

1. Practice of BMPs to reduce contaminants entering the river, thus improving water quality.

2. Restore the hydrology between the river and the adjacent swamp.

3. Restoration of reaches of the river that have been subject to mining activity.

4. Identify, protect and restore critical fisheries habitat in the watershed.

5. Control nuisance aquatic vegetation in the system and upstream at its source.

RECOMMENDATIONS

1. Work with landowners and other agencies to implement BMPs.

2. Continue to work with land owners and other agencies on projects to restore the hydrology between the river and the adjacent swamp

3. Work with the mining industry and other agencies on projects to restore reaches of the river that have been subject to mining activity.

4. Continue standardized sampling of fish populations to evaluate the condition of the stocks. Design a standard sampling protocol to identify critical fisheries habitat and aquatic life in the watershed.

5. This area will be assessed monthly during the growing season for nuisance aquatic plant infestations. Public complaints will receive a timely response. Problem areas will be treated as they arise with foliar applications in accordance with the approved LDWF Aquatic Herbicide Recommendations. Water hyacinth should be treated with 2,4-D at a rate of 0.5 gallons per acre. Common salvinia should be treated with a mixture of glyphosate (0.75 gallons per acre) and diquat (0.25 gallons per acre) with Aqua King Plus (0.25 gallons per acre) and Air Cover (12 oz. per acre) from April 1 – October 31. Diquat (0.75 gallons per acre) and a non-ionic surfactant (0.25 gallons per acre) will be used outside of that time frame. Alligator weed should be treated with imazapyr (0.5 gallons per acre) with Turbulence surfactant (0.25 gallons per acre). Alligator weed growth in developed areas will be treated with Clearcast (0.5 gallons per acre) and Turbulence surfactant (0.25 gallons per acre). Crested floating heart will be treated with Clearcast (0.5 gallons per acre) and Turbulence surfactant (0.25 gallons per acre).